VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Minor, Industrial permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9VAC25-260. The discharge results from the operation of a municipal potable water production plant. This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address: SIC Code: 4941- Water Supply System
   Harrisonburg WTP
   308 Grandview Drive
   Harrisonburg, VA 22802
   Location: 308 Grandview Drive, Harrisonburg

2. Permit No. VA0002746 Expiration Date: October 31, 2014

3. Owner: City of Harrisonburg
   Contact Name: Charles Dove
   Title: Superintendent of Water Treatment
   Telephone No: (540) 434-9534

4. Application Complete Date: March 24, 2014

   Permit Drafted By: Brandon Kiracofe Date: July 10, 2014
   Reviewed By: Dawn Jeffries Date: July 10, 2014

   Public Comment Period: July 24, 2014 to August 23, 2014

5. Receiving Stream Name: Cooks Creek, U.T.
   River Mile: 4.63
   Basin: Potomac Subbasin: Shenandoah
   Section: 5 Class: IV
   Special Standards: pH
   Impaired? ☑ Yes ☐ No Tidal Waters? ☐ Yes ☑ No
   Watershed Name: VAV-B25R – Cooks Creek

6. Antidegradation Review & Comments per 9VAC25-260-30: Tier: 1

   The State Water Control Board's Water Quality Standards (WQS) includes an AD policy (9VAC25-260-30). All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 water bodies is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

   The AD review begins with a Tier determination. Cooks Creek, UT was determined to be a Tier 1 water because there is no stream flow at the discharge point during critical flow conditions. Antidegradation baselines are not calculated for Tier 1 waters.

7. Permit Characterization:
   ☐ Private ☐ Federal ☐ State ☑ POTW ☐ PVOTW
   ☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

8. Operator License Requirements per 9VAC25-31-200.C: N/A

9. Reliability Class per 9VAC25-790: N/A

10. Description of Treatment Works: **Appendix A**

    Total Number of Outfalls: 1

11. Site Inspection: Performed by Lisa Kelly on February 6, 2014

12. Effluent Screening and Effluent Limitations: **Appendix C**

13. Whole Effluent Toxicity (WET) Program Requirements per 9VAC25-31-220.D: **Appendix C**

14. Management of Solids: Settled solids separated from the backwash wastewater are flushed intermittently to the sanitary sewer collection system. This operation is addressed in the facility O&M Manual.

15. Permit Changes and Bases for Special Conditions: **Appendix D**

16. Material Storage per 9VAC25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

17. Antibacksliding Review per 9VAC25-31-220.L: The permit complies with the antibacksliding provisions of the VPDES Permit Regulation.

18. Impaired Use Status Evaluation per 9VAC25-31-220.D: Cooks Creek, UT in the vicinity of the discharge is not listed; however, Cooks Creek at the confluence with the UT is listed as impaired for bacteria and for not meeting the General Standard (Benthics) for aquatic life use. The Cooks Creek Bacteria TMDL and the Blacks Run/Cooks Creek Benthic TMDL were both approved on June 5, 2002. This facility was not included in the Cooks Creek Bacteria TMDL because the facility is not expected to discharge bacteria. This facility was included in the Blacks Run/Cooks Benthic TMDL which assigned the facility a TSS waste load allocation (WLA) of 31,900 lbs/year.

19. Regulation of Users per 9VAC25-31-280.B.9: N/A – There are no industrial users other than the owner contributing to the discharge.

20. Storm Water Management per 9VAC25-31-120:
    Application Required? ☐ Yes ☑ No

    If "No," check one:
    - ☐ STPs: This facility does not have a design flow $\geq$ 1.0 MGD, nor is it required to have an approved POTW pretreatment program under 9VAC25-31-10 et seq.
    - ☑ Others: This facility's SIC Code(s) and activities do not fall within the categories for which a Storm Water Application submittal is required.

21. Compliance Schedule per 9VAC25-31-250: N/A – There are no compliance schedules included in this permit.

22. Variances/Alternative Limits or Conditions per 9VAC25-31-280.B, 100.H, and 100.N: None

23. Financial Assurance Applicability per 9VAC25-650-10: N/A – This facility is owned by a municipality.

24. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7:
At the time of this issuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☑ No

25. Nutrient Trading Regulation per 9VAC25-820:
Nutrient GP Required: ☐ Yes ☑ No

26. Threatened and Endangered (T&E) Species Screening per 9VAC25-260-20.B.8: Because this is not an issuance or reissuance that allows increased discharge flows, nor was a review requested, T&E screening was not conducted.

27. Nutrient monitoring included per Guidance Memo No. 14-2011: ☐ Yes ☑ No

This facility is a Nonsignificant Discharger (all facilities not classified as Significant Dischargers as defined in the Nutrient Trading Watershed General Permit Regulation 9VAC25-820) that has previously demonstrated through monitoring or characterizing the nature of the discharge that they are not a source of a net TP or TN load. Also, this permit does not include any outfalls that discharge solely stormwater exposed to industrial activity.

28. NPDES Permit Rating Worksheet: Score - 75 **Appendix A**

29. Public Notice Information per 9VAC25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Brandon Kiracofe at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7892, or brandon.kiracofe@deq.virginia.gov.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

30. Historical Record:

- VPDES Permit No. VA0002674 was reissued in November 1999, 2004, and 2009.
- No other historical records are available

APPENDIX A

DESCRIPTION OF TREATMENT FACILITIES

WASTEWATER GENERATION

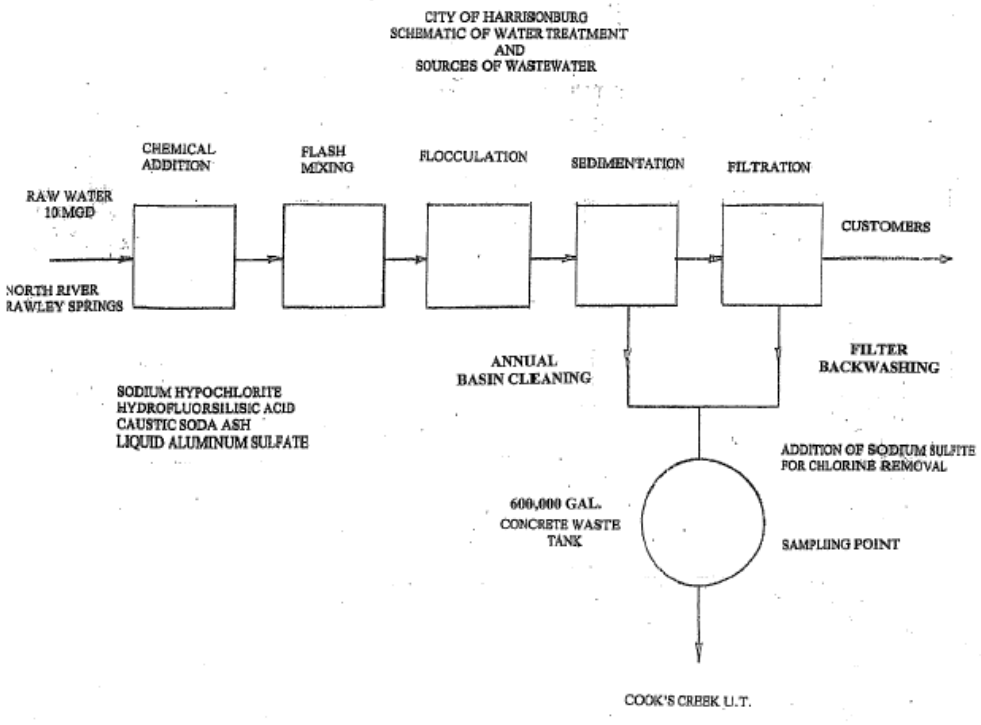
The facility produces potable drinking water for the city of Harrisonburg by treating raw water from North River and Rawley Springs using a multimedia gravity filtration process. The main treatment train is generalized in the line diagram below and includes chemical addition, flash mixing, flocculation, sedimentation, and filtration. Chemicals added during the potable water treatment process include sodium hypochlorite, liquid alum, caustic soda, and hydrofluorosilicic acid.

Wastewater is generated during daily filter backwashing and analytical instrument operation. Wastewater from cleaning the sedimentations tanks is currently discharged to the sanitary sewer collection system. The long term daily average wastewater generation rate is 0.350 MGD.

WASTEWATER TREATMENT

The wastewater treatment facilities include a sodium bisulfite dechlorination system and a 600,000 gallon wastewater settling tank. Per the June 2004 Concept Engineering Report addressing the design of the wastewater settling tank, the treatment design average capacity is 0.60 MGD. Following adequate solids separation and dechlorination, supernatant is discharged daily to Outfall 001 from the settling tank. Solids are routinely drawn from the bottom of the settling tank and transferred to the sanitary sewage collection system. This facility has an intermittent discharge with an average duration of 9.6 hours per day.

FLOW SCHEMATIC



VPDES PERMIT RATING WORK SHEET

Facilities identified under SIC Code 4941 have the following characteristics as defined in Appendix A to the NPDES Permit Rating Work Sheet found in the VPDES Permit Manual.

1987 SIC Code	1987 SIC Code Title	40 CFR 439 Sub-Part	Sub-part Title	Human Health Toxicity Number	Total Toxicity Number	Industrial Sub-category Number
4941	Potable Water Treatment Plant	NA	NA	7	7	NA

Factor 1 – Toxic Pollutant Potential - This rating is prescribed by the worksheet instructions regarding potable water treatment plant wastewater discharges. This is unchanged from the previous rating.

Factor 2 – Flow/Stream Flow Volume - Section A, Type II is selected because the discharge contains process wastewater which is discharged at a rate less than 1 MGD. This is unchanged from the previous rating.

Factor 3.A. – Oxygen Demanding Pollutant - The permit does not contain limits for BOD_5 or COD. This is unchanged from the previous rating.

Factor 3.B. – TSS - The permit contains limits for TSS. This is unchanged from the previous rating.

Factor 3.C. – Ammonia - The permit does not contain limits for any Nitrogen pollutants. This is unchanged from the previous rating.

Factor 4. – Public Health Impact - A worst case assumption is made for proximity to public water supplies. This is unchanged from the previous rating.

Factor 5.A. – The facility is subject to water quality based effluent limits. This is unchanged from the previous rating.

Factor 5.B. – The receiving water is not in compliance with applicable WQS for pollutants that are water quality limited in the permit. This is unchanged from the previous rating.

Factor 5.C. – Although the permit now contains Toxics Management Program requirements, the facility has not exhibited the reasonable potential to violate WQS due to whole effluent toxicity. The monitoring will serve to further demonstrate this fact. This is unchanged from the previous rating.

Factor 6. – Proximity to Near Coastal Waters: Headquarters Priority Permit Indicator (HPRI) Code #4 – This discharge occurs in a non-coastal county. This is unchanged from the previous rating.

NPDES PERMIT RATING WORK SHEET

[ ] Regular Addition
[ ] Discretionary Addition
[ ] Score change, but no status change
[ ] Deletion

NPDES NO. **VA0002674**
Facility Name: **Harrisonburg WTP**
City: **Harrisonburg**
Receiving Water: **Cooks Creek, U.T.**

Reach Number:

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate
[ ] YES; score is 600 (stop here) [✓] NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

[ ] YES; score is 700 (stop here)
[✓] NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: _____ Primary SIC Code: **4941** Other SIC Codes: _____
Industrial Subcategory Code: **000** (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
[ ] No process waste streams			[ ] 3.	3	15	[✓] 7.	7	35
[ ] 1.	1	5	[ ] 4.	4	20	[ ] 8.	8	40
[ ] 2.	2	10	[ ] 5.	5	25	[ ] 9.	9	45
			[ ] 6.	6	30	[ ] 10.	10	50

Code Number Checked : **7**

Total Points Factor 1: 35

FACTOR 2: Flow/Stream Flow Volume *(Complete either Section A or Section B; check only one)*

Section A [✓] Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	[ ]	11	0
Flow 5 to 10 MGD Points	[ ]	12	10
Flow > 10 to 50 MGD	[ ]	13	20
Flow > 50 MGD	[ ]	14	30
Type II: Flow < 1 MGD	[✓]	21	10
Flow 1 to 5 MGD	[ ]	22	20
Flow > 5 to 10 MGD	[ ]	23	30
Flow > 10 MGD	[ ]	24	50
Type III: Flow < 1 MGD	[ ]	31	0
Flow 1 to 5 MGD	[ ]	32	10
Flow > 5 to 10 MGD	[ ]	33	20
Flow > 10 MGD	[ ]	34	3

Section B [ ] Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	[ ]	41	0
	10 % to < 50 %	[ ]	42	10
	> 50 %	[ ]	43	20
Type II:	< 10 %	[ ]	51	0
	10 % to <50 %	[ ]	52	20
	> 50 %	[ ]	53	30

Code Checked from Section A or B: **21**

Total Points Factor 2: 10

FACTOR 3: Conventional Pollutants

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) [ ] BOD [ ] COD [ ] Other: N/A

			Code	Points
Permit Limits: (check one)	[ ]	< 100 lbs/day	1	0
	[ ]	100 to 1000 lbs/day	2	5
	[ ]	> 1000 to 3000 lbs/day	3	15
	[ ]	> 3000 lbs/day	4	20

Code Checked : **0**

Points Scored: **0**

B. Total Suspended Solids (TSS)

			Code	Points
Permit Limits: (check one)	[✓]	< 100 lbs/day	1	0
	[ ]	100 to 1000 lbs/day	2	5
	[ ]	> 1000 to 5000 lbs/day	3	15
	[ ]	> 5000 lbs/day	4	20

Code Checked : **1**

Points Scored: **0**

C. Nitrogen Pollutant: (check one) [ ] Ammonia [ ] Other: N/A

		Nitrogen Equivalent	Code	Points
Permit Limits: (check one)	[ ]	< 300 lbs/day	1	0
	[ ]	300 to 1000 lbs/day	2	5
	[ ]	> 1000 to 3000 lbs/day	3	15
	[ ]	> 3000 lbs/day	4	20

Code Checked : **0**

Points Scored: **0**

Total Points Factor 3: **0**

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

[X] YES (If yes, check toxicity potential number below)

[ ] NO (If no, go to Factor 5)

Determine the human health toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column [ ] check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
[ ] No process waste streams	0	0	[ ] 3.	3	0	[✓] 7.	7	15
[ ] 1.	1	0	[ ] 4.	4	0	[ ] 8.	8	20
[ ] 2.	2	0	[ ] 5.	5	5	[ ] 9.	9	25
			[ ] 6.	6	10	[ ] 10.	10	30

Code Number Checked : **7**

Total Points Factor 4: **15**

FACTOR 5: Water Quality Factors

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:

		Code	Points
[✓]	Yes	1	10
[ ]	No	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
[ ]	Yes	1	0
[✓]	No	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
[ ]	Yes	1	10
[✓]	No	2	0

Code Number Checked : A 1 B 2 C 2

Total Points Factor 5: A **10** + B **5** + C **0** = **15** TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from Factor 2): **21**

Enter the multiplication factor that corresponds to the flow code: **0.10**

Check appropriate facility HPRI Code (from PCS):

	HPRI#	Code	HPRI Score
[ ]	1	1	20
[ ]	2	2	0
[ ]	3	3	30
[✓]	4	4	0
[ ]	5	5	20

Flow Code	Multiplication Factor
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

HPRI code checked: 4

Base Score: (HPRI Score) **0** x (Multiplication Factor) **0.10** = **0** (TOTAL POINTS)

B. Additional Points --- NEP Program
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay? **N/A**

	Code	Points
[ ] Yes	1	10
[ ] No	2	0

C. Additional Points --- Great Lakes Area of Concern
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)*?* **N/A**

	Code	Points
[ ] Yes	1	10
[ ] No	2	0

Code Number Checked : A 4 B N/A C N/A

Points Factor 6: A **0** + B **N/A** + C **N/A** = **0** TOTAL

Score Summary

Factor	Description	Total Points
1	Toxic Pollutant Potential	**35**
2	Flows/Stream Flow Volume	**10**
3	Conventional Pollutants	**0**
4	Public Health Impacts	**15**
5	Water Quality Factors	**15**
6	Proximity to Near Coastal Waters	**0**
	TOTAL (Factors 1-6)	**75**

S1. Is the total score equal to or greater than 80? [ ] Yes (Facility is a major) [✓] No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

[✓] No

[ ] Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 75
OLD SCORE: 75

Fact Sheet – VPDES Permit No. VA0002674 – Harrisonburg WTP

APPENDIX B

DISCHARGE LOCATION DESCRIPTION AND RECEIVING WATERS INFORMATION

Harrisonburg WTP discharges to Cooks Creek, U.T. in Rockingham County. The topographical map below shows the location of Outfall 001.

TMDL & PLANNING EVALUATION

Relevant points of interest within the Cooks Creek watershed and in the vicinity of the subject discharge are shown on the Water Quality Assessments Review.

WATER QUALITY ASSESSMENTS REVIEW
POTOMAC-SHENANDOAH RIVER BASIN
5/6/2014

IMPAIRED SEGMENTS

SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER
B25R-01-BAC	Cooks Creek	13.31	0.00	13.31	E-coli, Fecal Coliform
B25R-01-BEN	Cooks Creek	13.31	0.00	13.31	Benthic
B25R-03-BAC	Sunset Heights Branc	4.31	0.00	4.31	Fecal Coliform
B26R-01-BAC	Blacks Run	10.73	0.00	10.73	E-coli, Fecal Coliform
B26R-01-BEN	Blacks Run	10.73	0.00	10.73	Benthic

PERMITS

PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0002674	**Harrisonburg WTP**	**Cooks Creek X-Trib**	**4.63**	**382735**	**0785416**	**VAV-B25R**
VA0090085	Dayton Water & Wast	Cooks Creek	7.65	382512	0785648	VAV-B25R

MONITORING STATIONS

STREAM	NAME	RIVER MILE	RECORD	LAT	LONG
Blacks Run	1BBLK002.10	2.10	03/03/70	382223	0785452
Blacks Run	1BBLK003.14	3.14		382339	0785401
Blacks Run	1BBLK003.86	3.86	10/22/67	382408	0785418
Blacks Run	1BBLK005.08	5.08	06/19/79	382435	0785323
Blacks Run	1BBLK005.27	5.27	09/23/99	382444	0785327
Blacks Run	1BBLK006.04	6.04	10/22/67	382519	0785315
Blacks Run	1BBLK006.81	6.81	06/19/79	382533	0785258
Cooks Creek	1BCKS005.10	5.10	11/13/67	382325	0785652
Cooks Creek	1BCKS006.62	6.62	01/02/01	382427	0785623
Cooks Creek	1BCKS007.71	7.71	11/13/67	382510	0785619
Cooks Creek	1BCKS010.02	10.02	06/19/79	382620	0785608
Cooks Creek	1BCKS011.27	11.27		382714	0785544
Cooks Creek	1BCKS007.26	7.26	10/17/00	382455	0785611
Cooks Creek UT	1BXEF000.19	0.19	06/19/79	382520	0785625
Cooks Creek UT	1BXEF000.23	0.23	04/14/05	382522	0785626
Cooks Creek UT	1BXEF000.35	0.35	08/05/80	382527	0785629
Pleasant Run	1BPLR005.51	5.51	11/30/99	382337	0785157
Pleasant Run	1BPLR006.07	6.07	11/30/99	382355	0785134
Silver Creek	1BSLV000.00	0.00	01/02/01	382512	0785620
Trabor's Pond	1BXTB000.01	0.01	05/25/00	382708	0785413
x-trib of Cooks Creek	1BXBU000.00	0.00	01/02/01	382455	0785610
x-trib of Cooks Creek	1BXBU001.70	1.70	05/11/00	382549	0785453
x-trib of Cooks Creek	1BXBU004.00	4.00	05/11/00	38276	0785412
Cooks Creek	1BCKS008.29	8.29	08/08/05	382513	0785650
Cooks Creek	1BCKS008.72	8.72	09/14/06	382531	0785658
Blacks Run	1BBLK005.62	5.62	05/26/99	382506	0785321

PUBLIC WATER SUPPLY INTAKES

OWNER	STREAM	RIVER MILE
DAYTON, TOWN OF	SILVER LAKE	0
HARRISONBURG, CI	SILVER LAKE	0

WATER QUALITY MANAGEMENT PLANNING REGULATION

Is this discharge addressed in the WQMP regulation? **No**

If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?

PARAMETER	ALLOCATION

WATERSHED NAME

VAV-B25R Cooks Creek

FLOW FREQUENCY DETERMINATION/MIXING ZONE EVALUATION

The receiving stream is intermittent and there is no flow at the discharge point during critical flow conditions. Because of this, mixing zones analyses were not conducted at the discharge point.

APPENDIX C

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

Effluent Limitations

A comparison of technology and water quality-based limits was performed, and the most stringent limits were selected. The selected limits are summarized in the table below.

Outfall 001 **Design Flow: 0.60 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1,3	NL		NL		1/Month	Estimate
TSS	1,4	30 mg/L	87 lbs/day	60 mg/L	170 lbs/day	1/Month	Composite
Total Residual Chlorine (TRC)(mg/L)	1,2,3	0.019		0.019		1/Month	Grab
---	---	Minimum		Maximum		---	---
pH (S.U.)	1,2,3	6.5		9.5		1/Month	Grab

NL = No Limitation, monitoring required
Composite = For continuous discharges, five grab samples collected at hourly intervals. For batch discharges, five grab samples taken at evenly placed intervals until the discharge ceases, or until a minimum of five grab samples have been collected. For continuous or batch discharges, the first grab shall occur within 15 minutes of commencement of the discharge.

BASIS DESCRIPTIONS
1. *VPDES Permit Manual*
2. *Water Quality Standards (9VAC25-260)*
3. *General VPDES Permit for Potable Water Treatment Plants(9VAC25-860)*
4. *Blacks Run/Cooks Creek TMDL*

Limiting Factors – Overview:

The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP)(9VAC25-720)	
A. TMDL limits	**TSS**
B. Non-TMDL WLAs	**None**
C. CBP WLAs	**None**
Federal Effluent Guidelines	**None**
BPJ/Agency Guidance limits	**TSS**
Water Quality-based Limits - numeric	**pH, TRC**
Water Quality-based Limits - narrative	**None**
Toxics Management Plan (TMP)	**See Pages C-3 to C-5**
Storm Water Limits	**None**

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS

Standard limits for pH and standard monitoring requirements for flow, pH, and TSS as specified in the VPDES Permit Manual for WTP backwash wastewater discharges were applied to the permit. There is no evidence to indicate these limits should not be applied to the discharge, or that other WQS parameters require effluent limits and/or monitoring.

The TSS loading limits comply with the facility's TSS WLA of 31,900 lbs/day. The TSS concentration limits reflect the standard limits for WTPs included in the VPDES Permit Manual and General VPDES Permit for Potable Water Treatment Plants (9VAC25-860). The limits have been carried forward from the previous permit.

The pH limits reflect the current WQS for pH in the receiving stream, are based on the VPDES Permit Manual and General VPDES Permit for Potable Water Treatment Plants (9VAC25-860), and have been carried forward from the previous permit.

EVALUATION OF THE EFFLUENT – NUTRIENTS

Nutrient monitoring and limits are currently not required for this industrial facility.

EVALUATION OF EFFLUENT TOXIC POLLUTANTS

Because metals (Cadmium, Chromium III, Chromium VI, Copper, Lead, Manganese, Mercury, and Zinc) have been previously evaluated, a toxics evaluation for these parameters is not required. TRC is the only toxic parameter requiring evaluation at this reissuance. The Water Quality Criteria (WQC) for TRC are not dependent on temperature, pH, or hardness. WQC and WLAs were calculated for TRC and are presented in this appendix. The discharge from this facility is intermittent; therefore, permit limits have been developed based on acute WQS only. The permit requires that the facility discharge intermittently. Because chlorine is utilized in the potable water production process, a default effluent concentration of 20 mg/L was utilized in the evaluation to generate an effluent limit.

WQS-WLA SPREADSHEET – Input

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name: Harrisonburg WTP
Receiving Stream: Cooks Creek, U.T.
Permit No.: VA0002674
Date: 5/9/2014
Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information			Effluent Information	
Mean Hardness (as CaCO3) =	mg/L	1Q10 (Annual) =	0 MGD	Annual	- 1Q10 Flow =	%	Mean Hardness (as CaCO3) =	mg/L
90% Temperature (Annual) =	deg C	7Q10 (Annual) =	0 MGD		- 7Q10 Flow =	%	90% Temp (Annual) =	deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	0 MGD		- 30Q10 Flow =	%	90% Temp (Wet season) =	deg C
90% Maximum pH =	SU	1Q10 (Wet season) =	0 MGD	Wet Season	- 1Q10 Flow =	%	90% Maximum pH =	SU
10% Maximum pH =	SU	30Q10 (Wet season) =	0 MGD		- 30Q10 Flow =	%	10% Maximum pH =	SU
Tier Designation =	1	30Q5 =	0 MGD				Current Discharge Flow =	0.60 MGD
Public Water Supply (PWS) Y/N? =	N	Harmonic Mean =	0 MGD				Discharge Flow for Limit Analysis =	0.60 MGD
V(alley) or P(iedmont)? =	V							
Trout Present Y/N? =	N							
Early Life Stages Present Y/N? =	Y							

Footnotes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
2. All flow values are expressed as Million Gallons per Day (MGD).
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
4. Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3.
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
6. Carcinogen "Y" indicates carcinogenic parameter.
7. Ammonia WQSs selected from separate tables, based on pH and temperature.
8. Metals measured as Dissolved, unless specified otherwise.
9. WLA = Waste Load Allocation (based on standards).
10. WLA = Waste Load Allocation (based on standards).
11. WLAs are based on mass balances (less background, if data exist).
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQS-WLA SPREADSHEET – Output

Facility Name: Harrisonburg WTP
Permit No.: VA0002674
Receiving Stream: Cooks Creek, U.T.
Date: 5/9/2014

WATER QUALITY CRITERIA
0.60 MGD Discharge Flow - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Aquatic Protection Acute	Aquatic Protection Chronic	Human Health Public Water Supplies	Human Health Other Surface Waters
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None

NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS
0.60 MGD Discharge - Mix per "Mixer"

Aquatic Protection Acute	Aquatic Protection Chronic	Human Health
1.9E-02 mg/L	1.1E-02 mg/L	N/A

PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS

According to the VPDES Permit Manual specific parameters must be evaluated for certain categories of WTPs. Unless there is data showing conclusively that Cadmium, Chromium, Copper, Lead, Mercury, and Zinc are absent, these data must be submitted and evaluated. In accordance with Guidance Memo No. 00-2011, this facility is treated as if there are not other toxic pollutants in the discharge unless there is actual evidence to indicate otherwise.

Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits.

Since the discharge is to an intermittent stream, all upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating available effluent data from WTPs are as follows:

A. If all data are reported as "below detection" or < the required Quantification Level (QL), and at least one detection level is ≤ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

   B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
   B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

   C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
   C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
   C.3. (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved", then the existing data set is inadequate to make a determination and additional monitoring is required.

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
METALS					
Cadmium, dissolved	7440-43-9	0.3	Previously evaluated. No further monitoring required.	---	---
Chromium III, dissolved	16065-83-1	0.5	Previously evaluated. No further monitoring required.	---	---
Chromium VI, dissolved	18540-29-9	0.5	Previously evaluated. No further monitoring required.	---	---
Copper, dissolved	7440-50-8	0.5	Previously evaluated. No further monitoring required.	---	---
Lead, dissolved	7439-92-1	0.5	Previously evaluated. No further monitoring required.	---	---
Mercury, dissolved	7439-97-6	1.0	Previously evaluated. No further monitoring required.	---	---
Zinc, dissolved	7440-66-6	2.0	Previously evaluated. No further monitoring required.	---	---
MISCELLANEOUS					
TRC (mg/L)	7782-50-5	0.1 mg/L	**Default = 20 mg/L**	**a**	**C.2**

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10^{-5}.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

"Source of Data" codes:
a = default effluent concentration

"Data Evaluation" codes:
See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

STAT.EXE Results:

Chemical = TRC
Chronic averaging period = 4
WLAa = 0.019
WLAc =
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683
97th percentile 4 day average = 33.2758
97th percentile 30 day average= 24.1210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.019
Average Weekly Limit = 0.019
Average Monthly Limit = 0.019

The data are: 20

WHOLE EFFLUENT TOXICITY (WET) EVALUATION:

Applicability of TMP: The applicability criteria for this facility to perform toxicity testing is contained in the Department's Guidance Memo No. 00-2012, Toxics Management Program Implementation Guidance, 08/24/00, Part IV. The Standard Industrial Code (SIC) for the Harrisonburg WTP is 4941 (Water Supply System) which is included in Appendix A of the TMP Guidance. In addition, the Instream Waste Concentration (IWC) is greater than or equal to 33% (GM 00-2012, Sections IV.1.A and IV.1.B, respectively). The toxicity testing requirements are based on the Potable Water Treatment Plant General Permit Regulation 9 VAC25-860-10.

Sample Type: A sample type of composite (as defined in Part I.A. of the permit) is representative of the discharge. The definition of composite is contained in the Potable Water Treatment Plant general permit regulation at 9 VAC25-860-70. The effective date of the general permit was December 24, 2013.

Intermittent Discharge: The discharge is intermittent. Therefore, the permit requires acute toxicity monitoring. Chronic toxicity monitoring is only required if the discharge is continuous.

Evaluation of Acute Instream Waste Concentration (IWCa): The Acute IWC is ≥ 33% (see Table 1); therefore, the acute toxicity criterion is No Observed Adverse Effect Concentration (NOAEC).

Calculation of WLAs: The Flow Frequency Determination indicates the 7Q10 and 1Q10 of the receiving stream. The design capacity of the wastewater treatment facility is 0.60 MGD. Acute WLAs were generated from the Department's WETLim10.xls spreadsheet by entering the design flow, stream flows, and stream mix percentages for the respective stream flows (See Table 1):

Dilution Series: The standard dilution series is recommended for acute testing.

Stat.exe Limit Evaluation: Based on the Acute WLA of 0.3 shown on the following spreadsheet, any test result (NOAEC) less than 100% will trigger a limit in the permit.

Midpoint Check Stat.exe Evaluation: Because the recommended dilution series is the standard 0.5 series, a midpoint check is not necessary.

Peer Reviewer: Dawn Jeffries
Date: June 17, 2014

Table 1
WETLim10.xls Spreadsheet

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 12/13/13
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	05/06/14
Facility Name:	Harrisonburg WTP
VPDES Number:	VA0002674
Outfall Number:	001

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa
ACUTE WLAa		0.3					

Note: Inform the permittee that if the mean of the data exceeds this TUa: **1.0** a limit may result using STATS.EXE

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	1.46257468	TU_c	NOEC =	69	% Use as	1.44	TU_c
BOTH*	3.00000007	TU_c	NOEC =	34	% Use as	2.94	TU_c
AML	1.46257468	TU_c	NOEC =	69	% Use as	1.44	TU_c

ACUTE WLAa,c	3
CHRONIC WLAc	1

* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: **1.0** a limit may result using STATS.EXE

		% Flow to be used from MIX.EXE		**Diffuser /modeling study?**	
Plant Flow:	**0.6** MGD			Enter Y/N	**n**
Acute 1Q10:	**0** MGD	**100** %		Acute	**1** :1
Chronic 7Q10:	**0** MGD	**100** %		Chronic	**1** :1

Are data available to calculate CV? (Y/N)	**N**	(Minimum of 10 data points, same species, needed)	Go to Page 2
Are data available to calculate ACR? (Y/N)	**N**	(NOEC<LC50, do not use greater/less than data)	Go to Page 3

IWC_a	100 %	Plant flow/plant flow + 1Q10	**NOTE: If the IWCa is >33%, specify the**
IWC_c	100 %	Plant flow/plant flow + 7Q10	**NOAEC = 100% test/endpoint for use**

Dilution, acute	1	100/IWCa
Dilution, chronic	1	100/IWCc

WLA_a	0.3	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	3	ACR X's WLA_a - converts acute WLA to chronic units

ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)

Constants	eA	0.4109447	Default = 0.41
	eB	0.6010373	Default = 0.60
	eC	2.4334175	Default = 2.43
	eD	2.4334175	Default = 2.43 (1 samp)

No. of samples: 1

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The $LTA_{a,c}$ and MDL using it are driven by the ACR.**

$LTA_{a,c}$	1.2328341	WLAa,c X's eA						
LTA_c	0.6010373	WLAc X's eB					Rounded NOEC's	%
MDL** with $LTA_{a,c}$	3.000000074	TU_c	NOEC =	33.333333	(Protects from acute/chronic toxicity)		NOEC = 34	%
MDL** with LTA_c	1.462574684	TU_c	NOEC =	68.372577	(Protects from chronic toxicity)		NOEC = 69	%
AML with lowest LTA	1.462574684	TU_c	NOEC =	68.372577	Lowest LTA X's eD		NOEC = 69	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

								Rounded LC50's	%
MDL with $LTA_{a,c}$	0.300000007	TU_a	LC50 =	333.333325	%	Use NOAEC=100%		LC50 = NA	%
MDL with LTA_c	0.146257468	TU_a	LC50 =	683.725769	%	Use NOAEC=100%		LC50 = NA	

APPENDIX D

PERMIT CHANGES AND BASES FOR SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page — Content and format as prescribed by the VPDES Permit Manual.

Part I.A.1 — **Effluent Limitations and Monitoring Requirements:** Bases for effluent limits provided in previous pages of this fact sheet. Monitoring requirements as prescribed by the VPDES Permit Manual. *Updates Part I.A.1. of the previous permit with the following:*

- The sample type for TSS was changed from 5G/8H to Composite and the corresponding footnote was also changed.

Part I.B — **Effluent Limitations and Monitoring Requirements – Additional Instructions***: Updates Part I.B. of the previous permit.* Authorized by VPDES Permit Regulation, 9VAC25-31-190 J 4 and 220 I. This condition is necessary when a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

Part I.C.1 — **Whole Effluent Toxicity (WET) Requirements:** *New Requirement*. VPDES Permit Regulation, 9VAC25-31-210 and 220.I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act.

Part I.D.1 — **95% Capacity Reopener:** *Updates Part I.C.1. of the previous permit.* Required by VPDES Permit Regulation, 9VAC25-31-200.B.4 for certain permits. Included for this facility to ensure that adequate treatment capacity will continue to be provided as influent flows and/or loadings increase.

Part I.D.2 — **Materials Handling/Storage:** *Identical to Part I.C.2. of the previous permit.* 9VAC25-31-50.A prohibits the discharge of any waste into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

Part I.D.3 — **O&M Manual Requirement:** *Updates Part I.C.3. of the previous permit.* Code of Virginia at 62.1-44.16, VPDES Permit Regulation 9VAC25-31-190.E, and 40 CFR 122.41(e) require proper operation and maintenance of the permitted facility. Compliance with the O&M Manual ensures this.

Part I.D.4 — **Concept Engineering Report (CER) Requirement**: *New requirement*. Section 62.1-44.16 of the Code of Virginia requires industrial facilities to obtain DEQ approval for proposed discharges of industrial wastewater. A CER means a document setting forth preliminary concepts or basic information for the design of industrial wastewater treatment facilities and the supporting calculations for sizing the treatment operations.

Part I.D.5 — **Reopeners:**

a. *Identical to Part I.C.4.a of the previous permit.* Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

b. *Identical to Part I.C.4.b of the previous permit.* 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

Part I.D.6	**Notification Levels:** *Identical to Part I.C.6 of the previous permit*. Required by the VPDES Permit Regulation 9VAC25-31-200.A for all manufacturing, commercial, mining, and silvicultural dischargers
Part I.D.7	**Acute Toxicity-Based Limits:** *Identical to Part I.C.5 of the previous permit.* The discharge from this facility is intermittent; therefore, permit limits have been developed based on acute Water Quality Standards (WQS) only. The special condition makes it a permit requirement that the facility discharge intermittently to prevent chronic and acute toxicity impacts.
Part II	**Conditions Applicable to All VPDES Permits:** *Updates Part II of previous permit.* VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.
Deletions	None